Chemistry 129.01 Quiz #3: 25 points

Name: _____

Show all your work!

1. (2 pts) Are the following sets of quantum numbers allowed?

   a) $n = 3, l = 4, m_l = -1$ _____

   b) $n = 4, l = 1, m_l = 0$ _____

2. (3 pts) What is the maximum number of electrons in an atom that can have the following quantum numbers?

   a) $n = 5, \ l = 3$ _____

   b) $n = 3, \ l = 1, \ m_s = ½$ _____

   c) $n = 2, \ m_s = ½$ _____

3. (4 pts) Draw the following orbitals: p_y and d_{xy}

4. (4 pts) Write the **full** electron configuration of the following:

   a) Cl^-

   b) Mn

5. (6 pts) Draw the **atomic orbital energy diagram** of the element with atomic number **8**. How many core electrons, valence electrons and unpaired electrons does it have?

6. (6 pts.) (a) Arrange the following elements in order of **increasing** atomic radius:
Mg, F, Rb^+, Al, Rb, S

(b) The oxide ion, O^{2-}, is isoelectronic (has exactly the same number and configuration of electrons) with Ne, and yet O^{2-} is bigger than Ne. Why?